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# Extensibility

2 minute read

WebAssembly is a sandboxing technology which can be used to extend the Istio proxy (Envoy). The Proxy-Wasm sandbox API replaces Mixer as the primary extension mechanism in Istio.

WebAssembly sandbox goals:

- **Efficiency** - An extension adds low latency, CPU, and memory overhead.
- **Function** - An extension can enforce policy, collect telemetry, and perform

payload mutations.

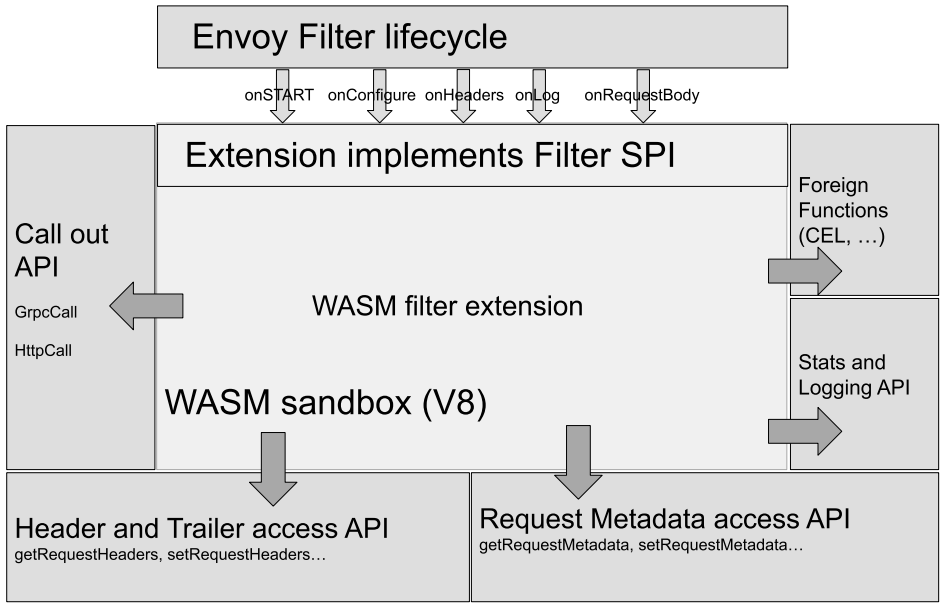
- **Isolation** - A programming error or crash in one plugin doesn’t affect other plugins.
- **Configuration** - The plugins are configured using an API that is consistent with other Istio APIs. An extension can be configured dynamically.
- **Operator** - An extension can be canaried and deployed as log-only, fail-open or fail-close.
- **Extension developer** - The plugin can be written in several programming languages.

This video talk is an introduction about architecture of WebAssembly integration.

# High-level architecture

Istio extensions (Proxy-Wasm plugins) have several components:

- **Filter Service Provider Interface (SPI)** for building Proxy-Wasm plugins for filters.
- **Sandbox** V8 Wasm Runtime embedded in Envoy.
- **Host APIs** for headers, trailers and metadata.
- **Call out APIs** for gRPC and HTTP calls.
- **Stats and Logging APIs** for metrics and monitoring.




Extending Istio/Envoy

# Example

An example C++ Proxy-Wasm plugin for a filter can be found here. You can follow this guide to implement a Wasm extension with C++.

# Ecosystem

- Istio Ecosystem Wasm Extensions
- Proxy-Wasm ABI specification
- Proxy-Wasm C++ SDK
- Proxy-Wasm Rust SDK
- Proxy-Wasm AssemblyScript SDK
- WebAssembly Hub
- WebAssembly Extensions For Network Proxies (video)